

The earliest deposition within the basin was probably Early Cretaceous, say 125 m.y. as Jurassic dolerites in Tasmania do not seem to be present in the Bass Basin. Faulted tilt blocks formed wedge shaped depressions into which alluvial fans poured material from the basin margins. In the southeast around Durroon this style of faulting continued throughout the Late Cretaceous as well. The major fault patterns were approximately 200° strike. The southeastern fault pattern has a strike 320° which follows the grain of the earlier Palaeozoic. At the basin margins the interplay of 290° 320° faults gives a zig-zag edge to the Cretaceous and this form persists throughout the fluvial phases of Late Cretaceous and Paleocene (early Latrobe equivalent).

Variations in basement tilt block patterns were achieved during the Early Cretaceous by a series of transfer (like transform) faults which allowed different directions of tilt blocks to develop and permitted variations in stretch of the brittle lithosphere of the Bass Basin. We estimate that the basement was extended about 50% across the main basin center.

In a model study by Garry Karner he produced the gravity field and Tertiary sag of the Bass Basin using our tilt block style of movement lasting 20 m.y.'s and then allowing the lithosphere to recover over the next 20 million years. The results are still being computed for the variations in temperature in the basin center. The lower than expected maturation of the Bass Basin is also explained by Garry's model because he has taken a 2 dimensional heat flow pattern, not the normal one dimensional heat-flow commonly used. This allows heat to escape from a narrow basin along the flanking blocks and suits our Bass Basin case.

The rift filled alluvial centers of the Early Cretaceous are therefore responsible for the driving mechanism for later "sag" (lithospheric flexure) basin which formed from the Late Cretaceous through the Tertiary.

The Mornington-King Island Rise is considered to be a much younger feature than the central Bass Basin. Although the Eocene generally laps-out against the region the northeast fault system appears to cut all marine sediment up to the Plio-Pleistocene and is even to the present day. A network of seismological stations in Melbourne has provided an earthquake pattern which suggests that the north-east fault system is still active.

I am left with two important questions on the Bass Basin region:- Did the Early Cretaceous form the same wedges of alluvial sediment across the Mornington-King Island region as it does in the basin center?

If the dying phases of the fault controlled deposition in the Early Cretaceous formed restricted alluvial systems in the Late Cretaceous and Paleocene, did these fluvial systems occur over the basin flanks?